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The Study of DC Metadata Application in the Library Database Construction of Gansu Normal College for Nationalities*

Jing-xing Fan

Department of Computer Science, Gansu Normal College for Nationalities, Hezuo, gansu ,747000, China

Yueguangli7@163.com

Abstract

With the development and wide application of computer and network technique, building digital and internet database has already become a trend, therefore how to manage and make use of the database resources becomes more and more important. Unlike the common text file, the modern database resources are multi-media files, which are not easy to be described and found, therefore the metadata play an important role in the database resources management and application, which must be fully used in the system. In the article, the author described the application of DC metadata in the library database construction of Gansu Normal College for Nationalities in theory and practice.

Keywords: DC metadata, library database, Gansu Normal University for Nationalities, construction

1. Introduction

At present, along with the development and widespread application of digital technology and network technology, database construction towards digital, networked direction has become a development trend of modern database construction. The various types of database construction is an opportunity, but also is a

* Contact Of Corresponding Author : Jinxing Fan, yueguangli7@163.com, 13893980096

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challenge. At the same time, because there is no uniform standard to manage and maintain these resources, so that the world, all kinds of database using different metadata, this gives the management and maintenance of the database is a big inconvenience [1]. While DC metadata has other metadata advantages, in the current database construction, it won the unanimous praise.

2. Metadata

In a database system, metadata is defined as: It is a structured data to provide information resource or data, it is a structural description on the information resources. Its function is: Describe the information resource or the features and attributes of data itself, provide the organization of digital information, have the function of positioning, found, prove, assessment, selection. The metadata can be used to retrieved, access database. The metadata system is made of a variety of different formats and different kinds of metadata standard, due to various kinds of metadata formats and standards are not compatible each other, with a format of metadata cannot be other formats accepted, unable to realize cross database access and retrieval, which is the interoperability problem. In order to solve the interoperability problems of different metadata, it can start from the following several aspects. One idea is to use a program to transform format between metadata, but the efficiency of this kind of method is not high when in the face of a variety of metadata formats coexist in the open environment of the application. The second idea is to use a core metadata standard, the other metadata are transformed to close it. Such as DC metadata, because of its easy to use, can be repeated, optional, easy to describe, universal, extensible features, can be used as a core metadata standard [2, 3]. As shown in Figure 1, DC metadata is used as core metadata tree structure chart. The third idea is to build a standard resource description framework --RDF. RDF is a metadata standard, it is published by W3C, this kind of system structure based on the usual sense of the semantic, grammatical and structural support, it provides a convenient to various metadata architecture interoperability. In this paper put the second ideas and third ideas together, the DC metadata and RDF structure is applied to the Gansu Normal College for Nationalities library database construction, at the same time XML language, JSP, JAVA language technology are used in the database construction.

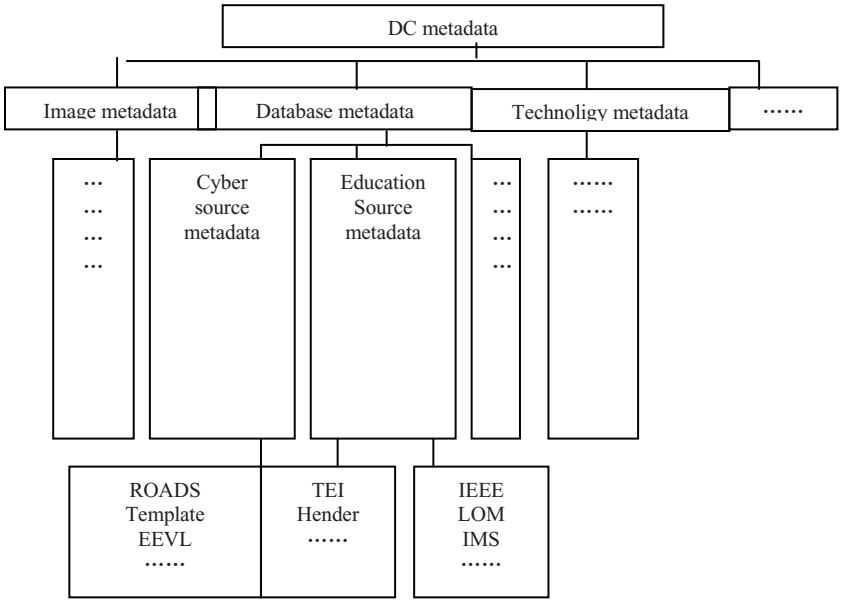

Figure 1 DC metadata is used as core metadata tree structure chart

3. Gansu Normal College for Nationalities library database framework structure

The library database of Gansu Normal College for Nationalities is the integration of all kinds of resources. It is different from the traditional library resources, it includes not only the traditional literature, but also has the local characteristics, such as language relates to Chinese, Tibetan and other. Due to its rich resources and a wide variety, so the construction of the database should be followed, openness, flexibility, interoperability, easy to expand and high adaptability. While DC metadata has the characteristic, so DC metadata is the first consideration metadata of construct the library database of Gansu Normal College for Nationalities, it is the foundation of digitization and database system design and function implementation.

The library database system of Gansu Normal College for Nationalities using B / S three layer system structure, as shown in figure2. The design of the whole system according to the principle of the separation of display and logic, content and representation. The system includes user layer, DC metadata service layer and data layer. Where the user layer is the realization of the library database system of Gansu Normal College for Nationalities and Internet link, it Can be implemented by using SOAP Technology; DC metadata service layer is the core part of the library database system of Gansu Normal College for Nationalities, it is responsible for the information extracting, display, it is also responsible for editing, modifying, additions and deletions, query DC metadata information in RDF, and confirm the user's rights; Resource data layer is the layer of storing large amounts of information resources, including the library database system data of Gansu Normal College for Nationalities, the source file and the processed information and metadata information. System through the three layer structure, turn the original XML documents in the data into user needs information, and achieved to manage and apply the library database system resource of Gansu Normal College for Nationalities. The application of combination XML, RDF and DC metadata, it can change the resource description and the description ability fundamentally, the unification of the resource description format and metadata standards, it brings about a fundamental change the scalability, flexibility and interoperability of the library database system resources of Gansu Normal College for Nationalities.

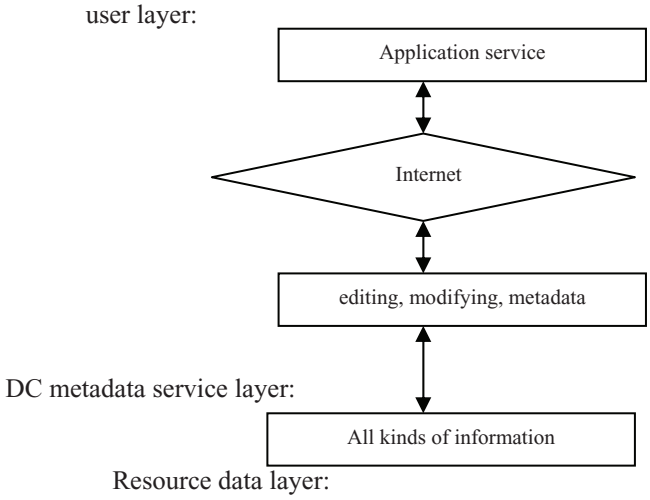

Figure2 B / S three layer system structure

The main function of the library database system of Gansu Normal College for Nationalities has a lot. The system function structure as shown in Table 1.

Table 1 Database system function table

Database system function			
Management module		Application module	
System management	Data management	Retrieval	Data mining

4. The description and data management of DC metadata in The library database system of Gansu Normal College for Nationalities

At present, DC metadata is made of fifteen data unit [4]. As shown in table 2.

Table 2 DC metadata

English name	Function	Group
Title	Resource name	Content
Creator	The content creator or organization	Intellectual property rights
Subject	Subject or key words	Content
Description	Text description	Content
Publisher	Issuing organization	Intellectual property rights
Contributor	A contribution to the person or organization	Intellectual property rights
Type	Belonging to the category or type	Instantiation
Rights	Copyright	Intellectual property rights
Source	The only source of derivative	Content
Relation	The relationship between various resources	Content
Date	Resource release date	Instantiation
Identifier	Identifying the resource strings or numbers	Instantiation
Coverage	Resource space (time) characteristics	Content
Language	description language	Content
Format	Data format	Instantiation

The library database system construction of Gansu Normal College for Nationalities, the scheme uses DC metadata, expansion of the four elements, respectively is: Others, reference, place, events. Scheme allows each element for different resource types have different show name and a different element modifier. New types of resources only selected elements from the attribute set of elements in principle.

Below is an example of the extended DC metadata to describe the library database system of Gansu Normal College for Nationalities. Such as:

<BODY>

<METANAME="DC Title" CONTENT="The library database system of Gansu Normal College for Nationalities">

<METANAME="DC Creator" CONTENT="Gansu Normal College for Nationalities">

<METANAME="DC Subject" CONTENT="Database home page">
<METANAME="DC Description" CONTENT="The introduction of the library database system of Gansu Normal College for Nationalities">
<METANAME="DC Publisher" CONTENT="Gansu Normal College for Nationalities">
<METANAME="DC Date" CONTENT="2012">
<METANAME="DC Type" CONTENT="Database">
<METANAME="DC Format" CONTENT="XML">
<METANAME="DC Identifier" CONTENT="http://www.gazzf.gov.cn/gannan/index.jsp">
<METANAME="DC Language" CONTENT="CN and TIBETAN">
<METANAME="DC Relation" CONTENT="http://www.gazzf.gov.cn">
<METANAME="DC Coverage" CONTENT="China">
<METANAME="DC Rights" CONTENT="Limit">
<METANAME="Place" CONTENT="The state of Gannan">
<METANAME="Events" CONTENT="The library database resource of Gansu Normal College for Nationalities">
<METANAME="Others" CONTENT="Area">
<METANAME="Reference" CONTENT="Related database">
<BODY>

The library database system of Gansu Normal College for Nationalities, the description of elements of the library database system resource of Gansu Normal College for Nationalities is very detailed. On the one hand, it is easy to manage and maintain the database resources. It can detailed descript the structure information of data set and semantic interpretation through metadata, it can convert metadata data format of other database, to realize the data sharing and mutual operation between sets. On the other hand, it is convenient for users to retrieve. The system supports Boolean retrieval, greatly improves the recall rate and the veracity rate. Such as: The user input query record in the system, the system passes through metadata data set, the formation of a relatively accurate query, it can greatly reduce the query returned results. At the same time the metadata also provides information about the data (such as organization, contact information, storage units), it can help users to get the data.

5. System modele analysis

This paper makes use of the state equation to analyze the model. The model equations of state are as follows:

$$C^{+}=\begin{bmatrix}0&0&0&0&0&0&0&0\\1&0&0&0&0&0&0&0\\0&1&0&0&0&0&0&0\\0&1&0&0&0&0&0&0\\0&0&1&0&0&0&0&0\\0&0&0&1&0&0&0&0\\0&0&0&0&1&0&0&0\\0&0&0&0&0&1&0&0\\0&0&0&0&0&0&1&0\\0&0&0&0&0&0&0&1\end{bmatrix}\qquad C^{-}=\begin{bmatrix}1&0&0&0&0&0&0&0\\0&1&0&0&0&0&0&0\\0&0&1&0&0&0&0&0\\0&0&1&0&0&0&0&0\\0&0&0&1&0&0&0&0\\0&0&0&0&1&0&0&0\\0&0&0&0&0&1&0&0\\0&0&0&0&0&0&1&0\\0&0&0&0&0&0&0&1\\0&0&0&0&0&0&0&0\end{bmatrix}\qquad C=\begin{bmatrix}-1&0&0&0&0&0&0&0\\1&-1&0&0&0&0&0&0\\0&1&-1&0&0&0&0&0\\0&1&-1&0&0&0&0&0\\0&0&1&-1&0&0&0&0\\0&0&0&1&-1&0&0&0\\0&0&0&0&1&-1&0&0\\0&0&0&0&0&1&-1&0\\0&0&0&0&0&0&1&-1\\0&0&0&0&0&0&0&1\end{bmatrix}$$

The initial state identification vector M0and final state identification vector M are as follows:

$$M_0=(1,0,0,0,0,0,0,0,0,0)^T\qquad M=(0,0,0,0,0,0,0,0,0,1)^T$$

According to the relation of identification vectors: M=CX+M Get $X=(1,1,1,1,1,1,1,1)^T$.

The solution corresponding to the trigger sequence is L =(t1,t2,t3,t4,t5,t6,t7,t8), Therefore, according to the sequence of L trigger various migration, it can reach the final state M from the initial state M0, namely the user applies for the network query, he obtains results at last

6. Conclusions

This paper argues that, due to DC metadata is easy, repeatable, selection, easy to describe, universal, extensible and other characteristics, related international organizations should consider the formulation of DC metadata standard firstly and vigorously promote and popularize, let all kinds of database resources of the world accept DC metadata standard and apply DC metadata in all kinds of database system, so we can achieve all kinds of database resources interoperability and sharing.

7. Acknowledgment

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